What is claimed is:

1. A microelectromechanical device, comprising;

a metal substrate;

cavity in said metal substrate; and

a micromachined released metal beam structure in said cavity.

2. The device of claim 1, wherein said substrate is a wafer.

3. The device of claim 1, wherein said substrate is a thin foil.

4. The device of claim 1, wherein said metal is titanium.

5. The device of claim 1, further including an enclosure for said cavity to form an enclosed package for said released beam structure.

6. The device of claim 5, wherein said enclosure is of the same metal as said wafer.

7. The device of claim 5, wherein said enclosure includes a top cover and a bottom cover for said substrate.

8. The device of claim 7, further including spacers between said substrate and said top and bottom covers.

9. The device of claim 5, wherein said enclosure includes a top cover and substrate, and a spacer between said substrate and said cover.

10. The device of claim 1, further including an electrically insulating layer on said metal beam structure, and an electrically conductive layer on at least a part of said insulating layer.

11. The device of claim 1, further including multiple spaced cavities in said substrate; and

micromachined released beam structures in selected cavities.

12. The device of claim 11, further including grooves in said wafer separating said multiple spaced cavities.

13. The device of claim 1, wherein said substrate is flexible.

14. A method for fabricating microelectromechanical (MEMS) structures in a metal substrate, comprising:

providing an insulating layer on a top surface of a metal wafer;

patterning and etching said insulating layer to form a mask defining a MEMS structure; and

deep etching the metal wafer through said mask using metal anisotropic reactive ion etching with oxidation to provide a first cavity corresponding to said MEMS structure in said wafer.

15. The method of claim 14, wherein said deep etching further includes:

depositing PECVD oxide on all exposed floor and wall surfaces of said cavity in said wafer;

removing the oxide from the floor of said cavity to expose said metal wafer; and further etching the exposed metal wafer.

16. The method of claim 15, further including:

etching to undercut the exposed wall surfaces of said cavity to produce a released MEMS structure.

17. The method of claim 16, further including depositing a conductive layer on at least a portion of said mask layer.

18. The method of claim 14, wherein said patterning and deep etching steps defines a released metal MEMS structure surrounded by a cavity, the process further including:

filling the cavity around and under the released structure with a deposited insulator;

removing the insulating mask layer on said structure in a region where electrical contact is to be made with said structure;

depositing metal to make contact with said structure;

depositing a second insulating layer over said contact metal; and

releasing said structure.

19. The method of claim 14, wherein said deep etching using metal anisotropic reactive ion etching comprises:

alternately and repeatedly applying an oxidation plasma and an etching plasma to said wafer to cyclically oxidize and etch metal exposed through said mask.

20. The method of claim 19, further including varying said oxidation plasma to change the quality and thickness of oxidation of said metal.

21. The method of claim 19, further including varying the amount of oxidation and etching performed in each cycle to controllably etch a cavity in said metal wafer and to control the surface roughness of cavity walls.

22. The method of claim 21, further including controlling the etching of a cavity to produce a released metal structure in said wafer.

23. The method of claim 22, further including implanting ions in said released metal structure to change the composition of the metal.

24. The method of claim 23, wherein the metal of said wafer is titanium, the method further including implanting selected ions in said released metal structure to change the composition of the metal to a selected one of the group consisting of Titanium Carbide, Titanium Boride, and Titanium Nitride.

25. The method of claim 21, further including controllably etching said cavity to produce substantially vertical cavity walls.

26. The method of claim 21, further including controllably etching said cavity to produce tapered cavity walls.

27. The method of claim 14, further including stacking and bonding multiple metal substrates containing MEMS structures.

28. The method of claim 14, further including enclosing said fabricated MEMS structures to form an enclosed package.